

Patent claims

1. Process for the manufacture of a plant lipoxygenase with altered position specificity, including the step
 - substitution of one or more amino-acids in a wild-type lipoxygenase
2. Process according to Claim 1, characterized in that the one or more amino-acid substitution(s) take place in the region of amino-acid position 527 to 536 and/or 593 to 602 of the lipoxygenase from *Cucumis sativus* or a corresponding position in a lipoxygenase from another variety of plant.
3. Process according to Claim 2, characterized in that the substitution takes place at position 531 and/or 597 of the lipoxygenase from *Cucumis sativus* or a corresponding position in a lipoxygenase from another plant.
4. Process according to Claim 3, characterized in that the substitution at position 531 puts into place a Phe- or His- residue and/or at position 597 a Val- or Phe- residue in the mutant.
5. Process according to Claim 4, characterized in that the substitution at position 531 represents a Val- -> Phe and/or at position 597 a His- -> Val- substitution.
6. Process according to one of Claims 1 - 5, characterized in that the amino-acid substitution is inserted by directed mutagenesis.
7. Lipoxygenase, obtainable through a process according to one of the Claims 1 - 6.

8. Nucleic acid which codes for a lipoxygenase according to Claim 7.
9. Vector containing a nucleic acid according to Claim 8.
10. Cell containing a nucleic acid according to claim 8 and/or a vector according to Claim 9.
11. Plant or part of a plant including a host cell according to Claim 10.
12. Process for the manufacture of 6-, 9- and/or 6, 9-hydroperoxy- γ -linolenic acid, including the step
 - Conversion of γ -linolenic acid with a lipoxygenase according to Claim 7.
13. Use of a lipoxygenase according to Claim 7 for the manufacture of 6-, 9- and/or 6, 9-hydroperoxy- γ -linolenic acid.
14. γ -linolenic acid derivative containing a hydroperoxy group or a hydroxy group at position 6.

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Summary

The present invention concerns a procedure for the manufacture of plant lipoxygenases with altered positional specificity as well as the lipoxygenase obtained through the procedure and its use for the hydroperoxylation of substrates. In particular the LOXs according to the invention permit for the first time the manufacture of new γ -linolenic acid derivatives in large quantity. For this γ -linolenic acid as substrate is incubated under suitable conditions with the LOXs according to the invention. Depending on the mutant LOXs put into use a hydroperoxylation of the γ -linolenic acid then ensues, preferably at position 6 or position 9 or positions 6 and 9.

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